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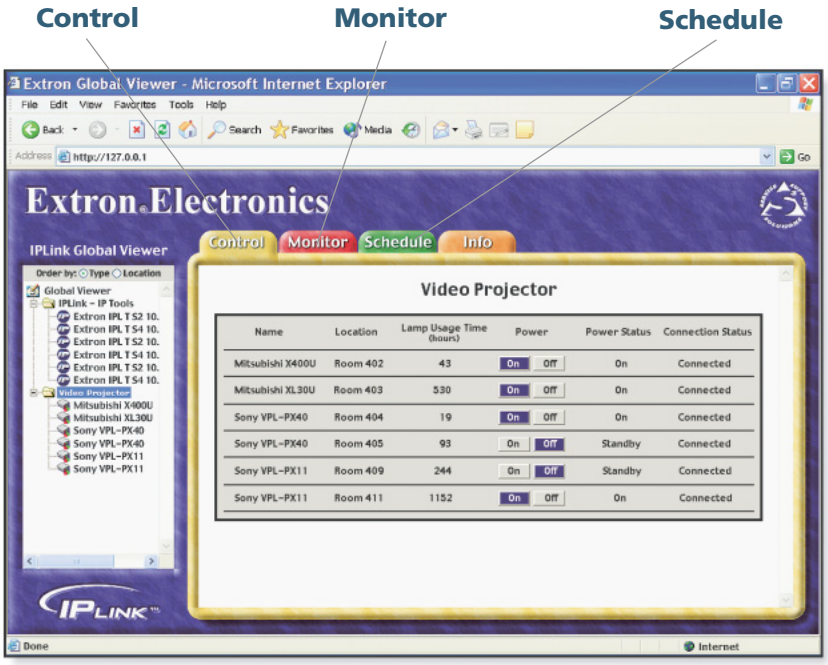
The Power and Flexibility of IP Link™ Global Viewer



The Global Viewer is the Web-based management and control application supplied with every IP Link™-enabled product.

The key to effectively integrating A/V systems into a network is the right software. You need a feature set robust enough to accommodate large, complex installations, yet the software should be simple to install and configure. That's why we developed Global Viewer, a powerful, flexible, easy to use application for monitoring and managing A/V systems.

The IP Link™ Global Viewer software is the Web-based management and control application supplied at no charge with every IP Link-enabled product. We developed it to support existing open Internet standards such as HTML, XML, and JavaScript. The Global Viewer Web pages are completely customizable using any off-the-shelf Web development software. Together with IP Link Technology, the Global Viewer provides a flexible and simple control interface for Extron and third party products.

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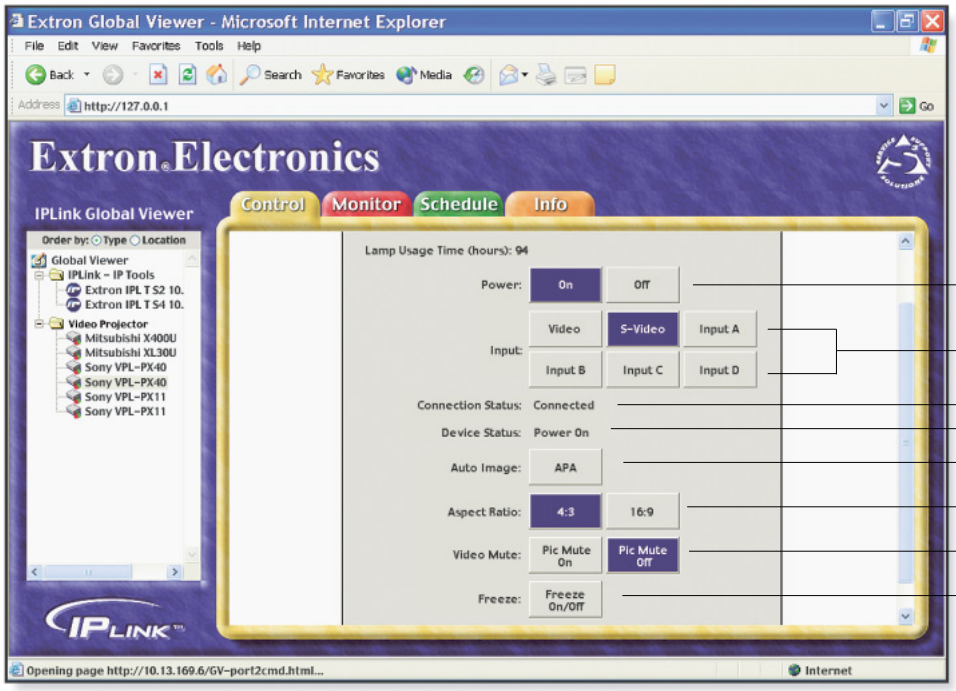
Control

The Control Screen allows you to remotely control many functions, including volume, power, input source, and more.



A key advantage of our approach is that the Global Viewer operates in a standard Web browser and is not based on an Extron proprietary application that requires users to learn a new programming language in order to use it, nor is there any lengthy certification process to master.

Configuring the Global Viewer

Creating Global Viewer pages is simple and intuitive. Once all system hardware is installed and connected, the Extron Global Viewer Configuration Utility can be run on any PC on the network. The Global Viewer Configuration Utility contains several intuitive screens for adding devices, setting IP address information, configuring serial ports, and defining management options. The configuration utility automatically generates HTML-based Web pages and loads device drivers based on device information provided and management options selected. Web pages are stored on the IP Link control interface and can be viewed from any computer with access to the network.

Web pages produced by the configuration utility are fully customizable once created. Using standard HTML editing tools, you can add images and logos, and modify text and background colors, creating a user interface that reflects your brand or your user's requests.

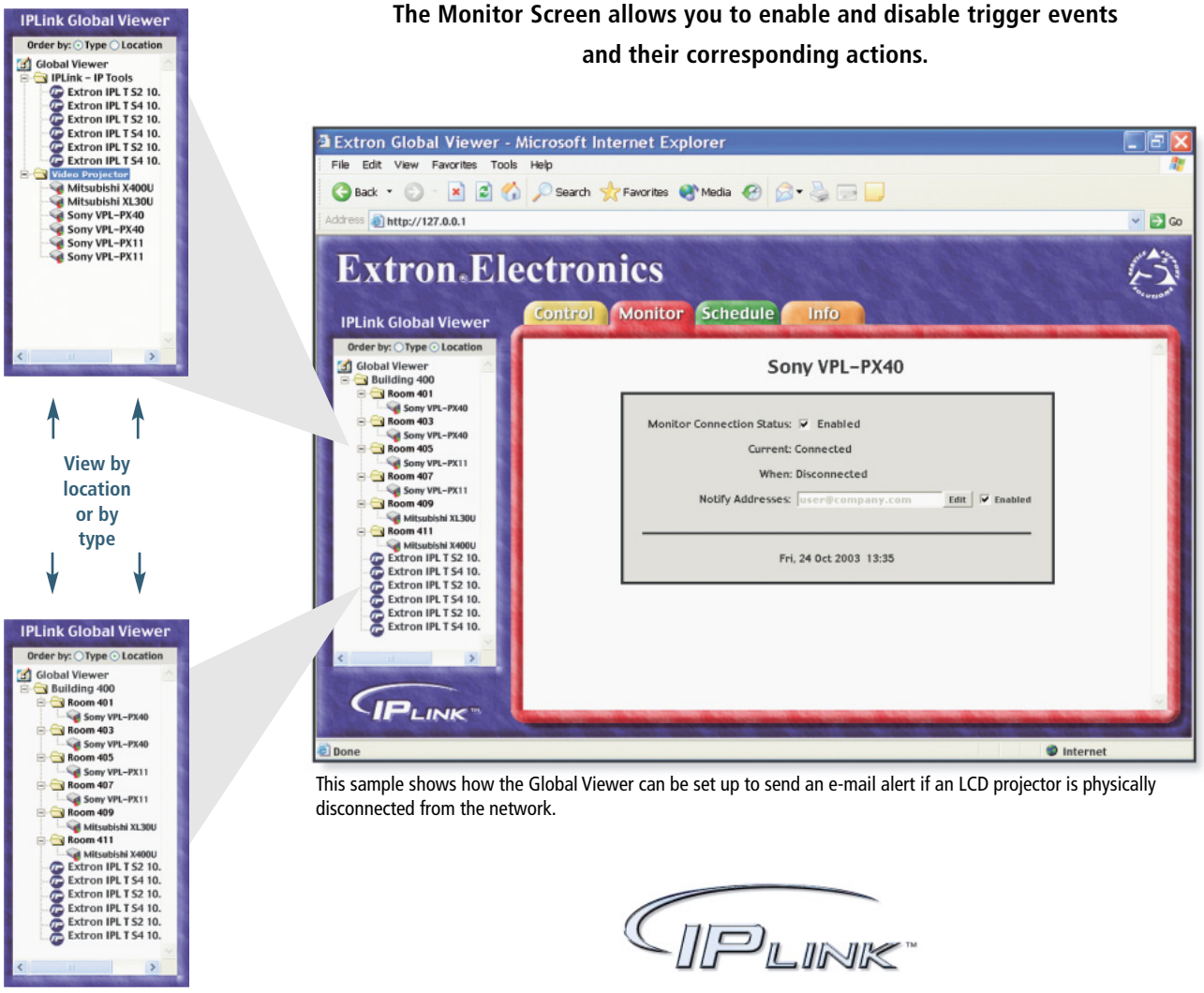
So, why implement a Web-based control and management system with IP Link and Global Viewer? The most compelling benefits can be illustrated using the three key functions of the Global Viewer: control, monitor, and schedule.

Control

The Global Viewer turns any standard Web browser into a universal remote. With IP Link technology, any device in the room currently controlled by a handheld remote or a control panel on the wall can be networked together and controlled from a single interface. These can include devices such as projectors, VCRs, switchers, screens, lights, and thermostats. Thanks to

Monitor

The Monitor Screen allows you to enable and disable trigger events and their corresponding actions.



This sample shows how the Global Viewer can be set up to send an e-mail alert if an LCD projector is physically disconnected from the network.

the wide availability of wired and wireless network access, that single control point can be a computer, a laptop, a PDA — even a Web-enabled cell phone.

Centralized room control is powerful enough, but the Global Viewer extends the idea to include the ability to control devices in multiple rooms from a single view. The interface allows you to view connected devices in two ways: by location or device type.

Monitor

Organizations have used the corporate network for management of their computer assets for years. With the Global Viewer, you don't have to be an IT expert to enjoy powerful, proactive asset management capability for your audio/ video system. The Global Viewer can display information like serial numbers, owner identification, maintenance history, usage data, and installed firmware versions. This centralized data can be collected via e-mail messaging and used to reduce maintenance costs and guide future purchasing decisions. Why purchase another set of expensive document cameras for newly constructed classrooms, for example, when your asset management data shows that only 50% of those you have are being used?

Technicians can troubleshoot remotely by viewing real-time device status such as power on or off and current input selection. With IP Link's e-mail functionality, accessed via the Global Viewer, devices can be configured to proactively manage themselves. For instance, a projector can be polled routinely to track lamp usage and total life time. When lamp usage reaches a predetermined number of hours, the IP Link interface can send an e-mail. E-mail messaging can also be used to notify security personnel if a device is

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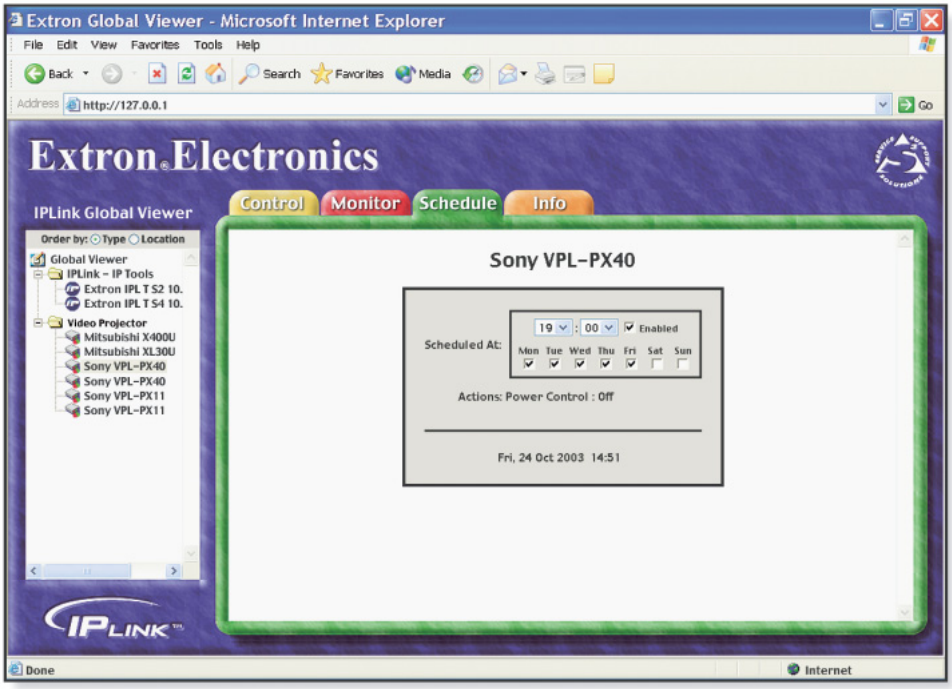
Schedule

At the Schedule Screen, you can view and modify scheduled events and associated e-mail alerts.



In this sample, an IP Tools interface is scheduled to power off an attached LCD projector each weekday at 7 pm local time.

physically disconnected from an IP Link interface that is monitoring its status.

Schedule

The Global Viewer uses the real-time clock and calendar in IP Link-enabled devices to maximum value. User-defined tasks are easy to configure and schedule with the Global Viewer. Would you like your system to turn themselves off all projectors at a time you specify, and raise the screen if it was left down? No problem. How about instructing a single room to turn specific equipment on, and set its thermostat to a predetermined temperature just before a scheduled presentation? Easy. Scheduling tasks and e-mail reminders is simple and straightforward and doesn't require high-level programming skills.

I hope you're beginning to catch a glimpse of the possibilities that Web-based management affords using the IP Link Global Viewer. It's a powerful tool that allows you to control, manage, and automate your entire A/V system via the Internet — from inside the room or across the globe.

Centers For Disease Control Receives A/V Booster in Battle Against Diseases and Threats

The Centers for Disease Control and Prevention (CDC) is the preeminent federal agency in the US for protecting the health and safety of people in the US and abroad. It provides credible data and information to combat and contain deadly diseases and viruses, while promoting health around the world.

Founded in 1946 as the Communicable Disease Center, the CDC has worked assiduously throughout the years to alert and suppress outbreaks of malaria, polio, smallpox, and Acquired Immune Deficiency Syndrome (AIDS). More recently, the CDC has been besieged with the peril of anthrax, as well as contagious diseases like Severe Acute Respiratory Syndrome (SARS) and monkeypox.

The demands placed on the CDC have surpassed all expectations. However, their makeshift base of operations — a hodge-podge of phones, pagers, computers, and random pieces of A/V equipment in a converted auditorium — wasn't properly set up to handle the workload and overflow in a timely and efficient manner. The need for a large, modern, permanent facility was apparent, but obtaining federal funds through the proper channels would take time — something the CDC simply didn't have.

In April 2002, Bernard Marcus, co-founder of Home Depot, stepped up to the plate and pledged $3.9 million to begin production of a new CDC facility. With additional funding and donations of time and equipment from various corporate and philanthropic entities, construction of the CDC's new Marcus Emergency Operations Center (EOC) in Atlanta, GA, began in the fall of 2002 and was completed in April 2003.

"CDC's new state-of-the-art facility enables us to employ an integrated response to any public health emergency and better protect the American public," Tommy G. Thompson, Health and Human Services (HHS) Secretary, said during the dedication of the EOC. "The emergency operations center allows us to more efficiently track and respond to disease outbreaks."

The EOC is a 7,000 square foot, 24/7 mission-critical building designed to monitor the spread of diseases and possible bio-terrorism threats worldwide. At its core is a professional A/V system with two video walls, several plasma displays, a sophisticated touch panel control system, and a variety of Extron products to tie it all together.

"After 9/11, there became a need to have a centralized location for all of the groups in the CDC to conduct operations," said Ron Willis, Operations Manager for Sytex Inc., Advanced Presentation Systems Division, a Virginia-based system integrator that led the design and installation of all the A/V equipment. "The system we put in has allowed the CDC to accomplish far more than they ever imagined."

Main Operations Floor

Much of the CDC's work takes place on the main operations floor of the EOC. Here, the center's staff of scientists, doctors, and researchers gather and organize data from all

Two CDC staff members confer on the EOC's main operations floor.

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Centers For Disease Control Receives A/V Booster in Battle Against Diseases and Threats (continued)

over the world. According to Willis, images of real-time events, statuses, alerts, news, and maps are transmitted via cable, satellite, and computer feeds and displayed onto eight 50-inch DLP projection cubes with their own multimedia wall controllers. The projection cubes are set up in 2x2 arrays, creating two video walls that enable the CDC staff, sitting before theater-style workstations, to easily access, decipher, and prioritize all incoming information.

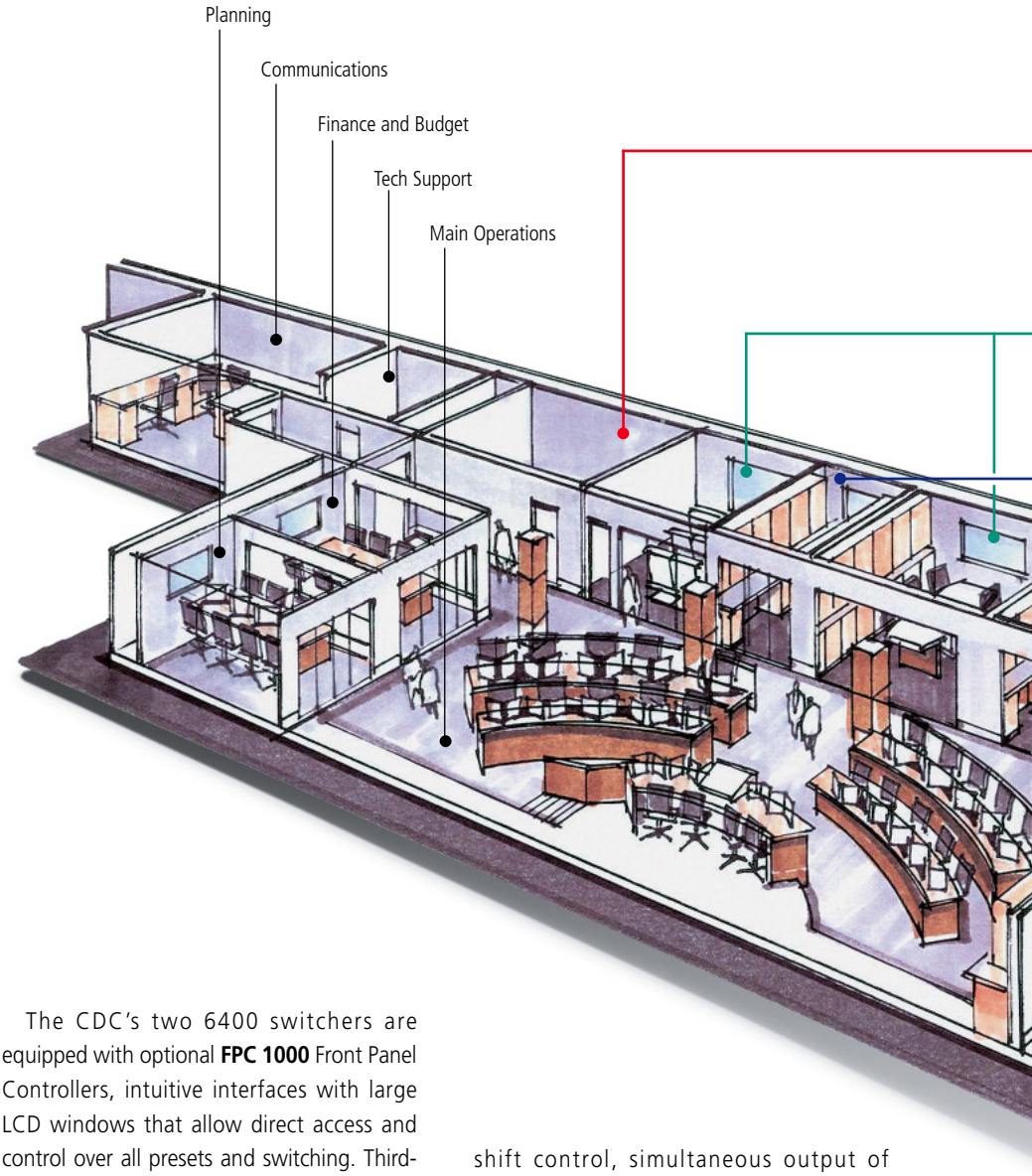
To route the signals on the main operations floor and throughout the facility, the Sytex team chose the Extron **Matrix 6400** Series. Designed for large scale routing applications that require up to 64 inputs and 64 outputs, the Matrix 6400 provides customizable and modular switching of composite video, S-video, component video, RGsB, RGBS, RGBHV, and one or two channel audio.

The EOC control room houses the entire infrastructure for the main floor. There are 12 racks in the control room including two filled with multiple Matrix 6400 Basic Module Enclosures (BMEs) to accommodate all incoming feeds and outgoing signals. "We have a Matrix 6400 wideband and a Matrix 6400 video," Willis said.

Both switchers were originally configured for 48x32, but Sytex is in the process of upgrading them to 64x64. This flexibility to accommodate growing systems is one of the main reasons the Matrix 6400 series was chosen. "Eventually, we will need to expand to different rooms, and the 6400 offers the capability to do that easily," Willis said.

Another key element to the Matrix 6400 is the "rooming" feature. The switcher can be programmed to group multiple outputs to specific "rooms," allowing them to have their own presets. Each matrix can support up to 10 rooms and can consist of up to 16 signals. Because there are a total of 100 room presets available, the switcher is future-ready.

The Marcus Emergency Operations Center



The CDC's two 6400 switchers are equipped with optional **FPC 1000** Front Panel Controllers, intuitive interfaces with large LCD windows that allow direct access and control over all presets and switching. Third-party, networked touch panel screens are installed for monitoring and controlling the entire A/V system.

Team Rooms

There are six team rooms in the EOC that operate independently from the rest of the facility. All of the team rooms include six desktop computers, each with its own Extron **RGB 190FV** universal, analog computer-video interface. The RGB 190FV features horizontal shift control, simultaneous output of composite and separate H&V sync, sync on green output and serration pulse removal, and Digital Display Sync Processing (DDSP), which allows sync to be output in its original state and ensures compatibility with LCD, DLP, and plasma digital display devices.

The team rooms also feature a 42-inch plasma display with external speakers and a rack populated with a CATV tuner, a VCR, and an Extron **CrossPoint 128HVA**, a 12x8

Marcus Emergency Operations Center (EOC) Equipment

Equipment Room

- Extron Matrix 6400
- Extron FPC 1000
- Extron CrossPoint 1616HVA
- Extron MAV 1616 AV
- Extron USP 405

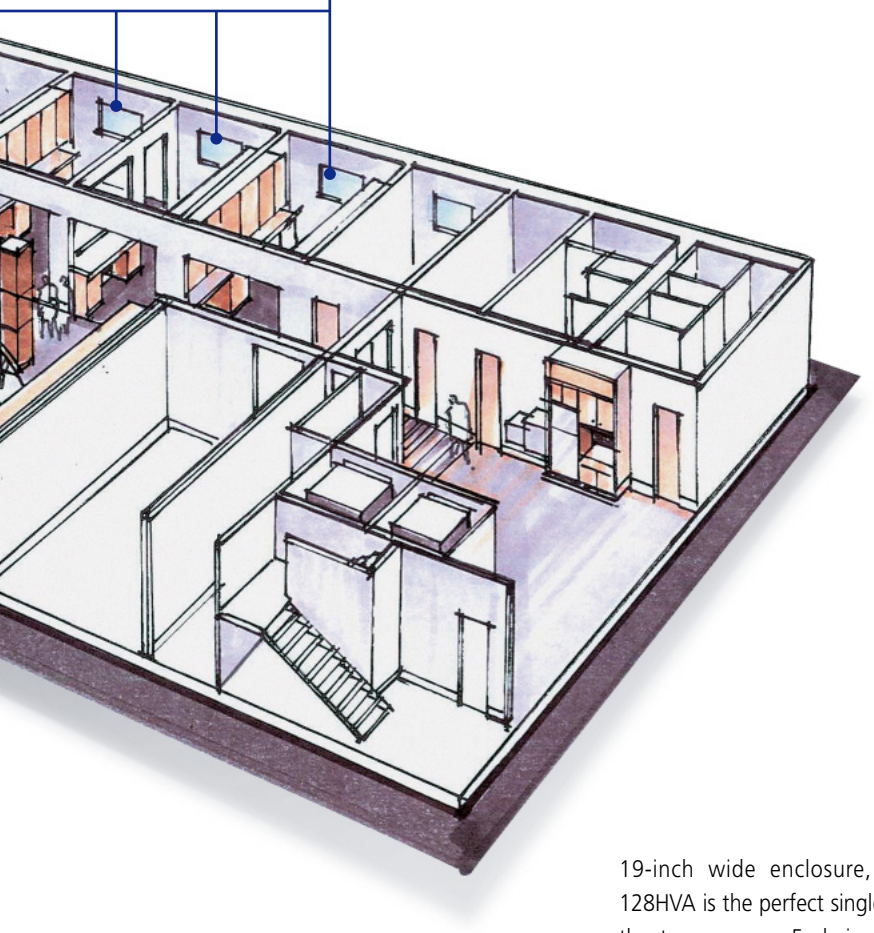
Team Room

- Touch panel controller
- 6 computers
- 6 Extron RGB 190FV Interfaces
- 42" plasma display
- Equipment rack containing:
  - Extron CrossPoint 128HVA
  - CATV tuner
  - VCR

Executive Briefing / Video Conference Room

Each video conference room contains the following equipment:

- Extron MAV 1616 AV
- Extron CrossPoint 1616HVA
- Extron RGB 190FV
- Extron RGB 464xi
- Extron USP 405
- Computers
- 61" plasma display
- Interactive digital white board
- Document camera
- VCR players
- DVD players



analog RGBHV wideband matrix switcher. CrossPoint HVA models switch RGBHV signals and two-channel audio (balanced and unbalanced). Housed in a rack-mountable, 19-inch wide enclosure, the CrossPoint 128HVA is the perfect single box solution for the team rooms. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels.

All of the sources in the team rooms can be displayed locally, while an additional output is connected to the Matrix 6400 switchers for presentations that need to be funneled onto the main floor and/or to other rooms. The team rooms, like the Main Operations Floor, utilize a third-party touch panel screen to monitor and control the A/V system.

Videoconference Rooms

The EOC is rounded out by two large, executive-style videoconference (VC) rooms. These rooms are essential to the CDC's objective of coordinating and maintaining communications with outside officials regarding health and safety issues. When the Columbia Space shuttle catastrophe occurred in early 2003, temporary VC communications were set up with local and state public health agencies to discuss hazards from falling debris. More recently, with the VC rooms fully operational, communications were established with health organizations in Geneva and Hong Kong to discuss the SARS epidemic.

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Centers For Disease Control Receives A/V Booster in Battle Against Diseases and Threats (continued)

The Executive Briefing room (which doubles as a VC room) of the Emergency Operations Center.

Both VC rooms are equipped to the nines with A/V components. At the display end, each VC room features a 61-inch plasma and an interactive whiteboard. There are also a variety of sources. "We have several RGB inputs and several video inputs," Willis said. To handle the broad spectrum of sources (VCRs, DVD players, document cameras, and computers) and signal types, there are two racks in the control room dedicated to the VC rooms. Each rack is populated with two matrix switchers: an Extron **MAV 1616 AV** and an Extron **CrossPoint 1616HVA**.

The MAV 1616 AV is a composite video and stereo audio matrix switcher designed for applications that require routing of composite video with stereo audio (balanced/unbalanced) signals. With 16 inputs and 16 outputs, the MAV 1616 includes a preset feature that allows up to 16 I/O configurations to be stored in memory for future use. It also provides audio follow so any audio signal can be selected with any video signal simultaneously, as well as audio breakaway, which allows signals to break away from corresponding video signals and be routed separately.

Extron Matrix 6400 Basic Module Enclosures fill two of the 12 racks inside the Center's equipment room.

This videoconference room is equipped with a 61-inch plasma and touch panel control system.

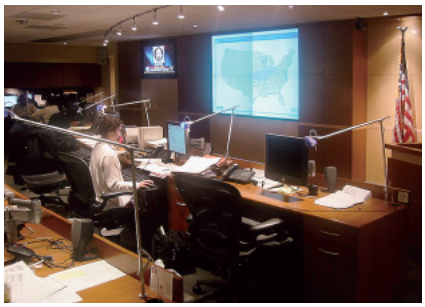
The CrossPoint 1616HVA is an analog RGBHV matrix switcher for switching RGBHV signals and two-channel audio (balanced and unbalanced). Offering 200 MHz (-3dB) of RGB video bandwidth, fully loaded, the CrossPoint 1616HVA includes adjustable input audio gain and attenuation so users can set levels without any noticeable volume differences between sources.

In the VC rooms, the MAV 1616 AV is used to handle all standard definition composite signals, while the CrossPoint 1616HVA routes the high resolution RGBHV signals.

In addition, the VC rooms are hooked up with a number of RGB 190FV interfaces, as well as several Extron **RGB 464xi** universal, analog computer-video interfaces that can be mounted in a three-gang wall box. The RGB 464xi includes a 15-150 kHz horizontal frequency range, 300 MHz (-3dB) of bandwidth, and Extron's Advanced Digital Sync Processing (ADSP™), which provides all-digital processing of sync signals, avoiding the tearing and other image distortions encountered when using poor sync processing methods with digital display devices (DLP, LCD, D-ILA™/LCoS, plasma, etc.). Willis mentioned that the RGB 464xi also has "a nice clean appearance that meets our requirements."

To top it off, an Extron **USP 405** Universal Signal Processor is included in each VC room to supplement any video signal conversion requirements. As an all-in-one box solution, the USP 405 is able to perform as a high performance scaler, scan converter, trans-converter, format converter, switcher, and transcoder. It accepts a wide range of video signal formats, processes them, and outputs them all in one format directly to a digital display, projector, or editing device. There's virtually no limit to what the USP 405 can accomplish within an environment like the CDC.

Centers For Disease Control Receives A/V Booster in Battle Against Diseases and Threats (continued)



On the main operations floor, staff members assess all incoming public health alerts.

The EOC's main operations floor features eight 50-inch DLP projection cubes set up in 2x2 arrays.

The CDC staff views the latest health alerts via LED reader boards.

To maximize the quality of the output image, the USP 405 features several Extron proprietary video processing technologies: Dynamic Motion Interpolation (DMI™), 3:2 (NTSC) and 2:2 (PAL) pulldown detection, and the patented Accu-RATE Frame Lock (AFL™). DMI technology is an advanced motion detection and compensation method used to deliver the best aspects of still and motion algorithms, resulting in a superior image; 3:2 and 2:2 pulldown detection is an advanced film mode that helps maximize image detail and sharpness for NTSC or PAL sources that originated from film; and AFL solves frame rate conversion issues such as glitches by locking the output frame rate to the input frame rate.

Mission Critical

Because the CDC's goals are of a highly critical, fast-response nature, it was crucial that all equipment be dependable and simple to use. "This is a 24/7 facility," Willis confirmed. "It's a known fact that Extron manufactures the type of equipment effective in this type of environment."

Willis also said the reaction to the A/V system has been nothing short of spectacular. To put it all in perspective, Charles Stokes, president and CEO of the CDC Foundation, stated: "The technologies available to the scientists working in the operations center are truly cutting edge."

In short, the variety of Extron products in the CDC not only aid in keeping the A/V system technically up to speed and easy to use, they also play a key role in making sure the world's health issues are monitored and attended to as expediently as possible.

For more information on the Web:

Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov

CDC Foundation
http://www.cdcfoundation.org

Sytex Inc.
http://www.sytexinc.com

The MVC 121 and RAC 104 Audio Control for Integrated A/V Systems

Extron has been making a little noise in the audio world. We now offer more switchers with key audio features such as preamp line level audio for fixed and variable outputs and integrated audio amplifiers. We have developed specialized audio products that enable additional processing control for program and distributed audio systems. At InfoComm 2003, three new audio summing amplifiers were introduced for converting two-channel stereo audio signals to balanced/unbalanced one-channel mono audio signals. Now, we have added two more products designed for the integration A/V market: the **MVC 121** audio mixer and the **RAC 104** remote volume tone and tone controller.

The Extron **MVC 121** is a high performance microphone and line level mixer with volume control. It includes two microphone/line level inputs and a third line level only input — each with its own volume control. The MVC 121 also features:

- **RS-232 control and contact closure muting**
- **Line level outputs**
- **48V microphone phantom power**
- **Front panel LEDS**
- **Two modes of front panel security lockout**

The Extron **RAC 104** is a four channel remote volume and tone controller. It provides up to four channels for controlling volume, bass, and treble. The RAC 104 features:

- **RS-232 control and three presets per channel**
- **Compatibility with any audio amplifier**
- **Professional and consumer audio levels**

Both the MVC 121 and RAC 104 include external power supplies and are housed in 1U, quarter rack width metal enclosures for flexible mounting under or through a desk or in a rack.

Applications

The MVC 121 and RAC 104 can accommodate up to four audio channels while optimizing sound reinforcement in integrated A/V environments. **Figure 1** is an example of a two-channel application with two front program speakers and two podiums, each with its own microphone. With the MVC 121, the user is able to provide a stereo input for an audio source and inputs for two dynamic or condenser microphones. Volume can be controlled for each individual input and the mixed program output.

In **Figure 2**, a three-channel application comprises two channels for program speakers and a third channel for distributed ceiling speakers. The RAC 104 allows the user to define the channels as mono or stereo. The line level selection DIP switch also enables the user to choose between consumer or professional level inputs and outputs. The RAC 104 can control the volume, bass, and treble of program speakers. It can also control the volume and tone of a third channel for the distributed speakers placed on the ceiling. A similar scenario would apply to **Figure 3** with the addition of a fourth channel. In this instance, however, instead of indirectly inputting a microphone into the third or fourth channel, another external audio source could play background music on both channels in stereo.

Figure 4 is another example of a four-channel application. The difference here is that channels three and four are now assigned to zones. The user can control the tone and volume in various parts of the room, often resulting in an even distribution of sound throughout the entire area.

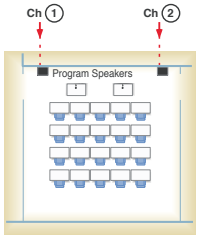


Figure 1
Class Room Top View
Two-Channel Application
(Two front program speakers)

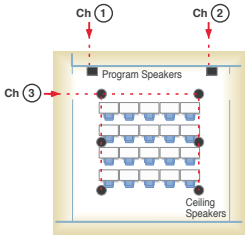


Figure 2
Class Room Top View
Three-Channel Application
(Two front program speakers and one channel distributed ceiling speakers)

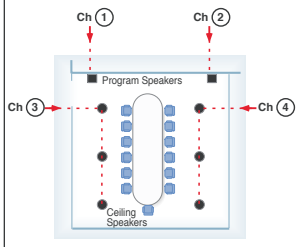


Figure 3
Meeting Room Top View
Four-Channel Application
(Two front program speakers and two channel distributed ceiling speakers)

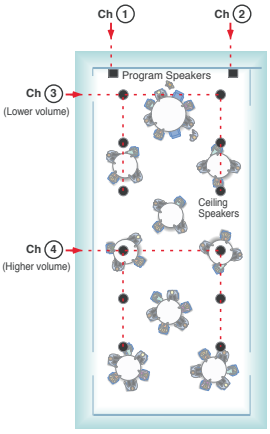


Figure 4
Ballroom Top View
Four-Channel Application
(Two front program speakers and two zone distributed ceiling speakers)

by Jeff Gibson, Vice President of Sales

Product Labels Offer a Unique and Valuable Resource

After a new product is removed from the box and installed, the manual, as most A/V technicians know, is usually the first thing to go. However, with Extron products, critical operating information is always at your fingertips.

One of the often overlooked benefits of Extron products is quietly hiding on the bottom of most units. Our production staff conveniently affixes detailed product labels to most products, so when the manual is long gone, installers and end users have the facts they need to identify, set up, and use the product. The information listed varies depending on the product, but usually a description, installation data, and connectivity diagrams are provided. Other information can include audio diagrams, pinout tables, and troubleshooting guides as shown in the RGB 203 Rxi label below.

Contact phone numbers and addresses are also included, so if any questions arise, the user can reach an Extron Customer Support Representative to answer those questions.

RGB 203 Rxi / RGB 203 Rxi VTG Universal Interface with Audio

Description

The Extron **RGB 203 Rxi** is an analog computer-video interface with 300 MHz (-3dB) video bandwidth and Advanced Digital Sync Processing (ADSP™). It accepts 3 computer-video inputs and 2 unbalanced stereo audio inputs. It outputs RGBHV/RGBS/RGsB video and balanced, line level, stereo or mono audio. The **RGB 203 Rxi VTG** also includes a mini video test generator.

Installation

- Turn all equipment off and disconnect the power cords from the power source.
- Install rubber feet, or install appropriate brackets and furniture or rack mount the interface.
- Attach the computer, output (display, local monitor, audio), and remote control cables.
- Set the **rear panel DIP switches**.

1 – DDSP (Digital Display Sync Processing)
On – DDSP (no sync processing).
NOTE Disables H & V controls.
Off – ADSP (sync is processed during operations such as H & V centering).

2 – SOG (sync on green)
On – The interface outputs composite sync on the green video plane.
Off – The interface outputs both separate H & V sync and composite sync.

3 – SERR (serration pulse) – Use if flagging or bending occurs at the top of the image.
On – The interface outputs serration pulses.
Off – Serration pulses are not output.

4 – V SYNC Width (vertical sync pulse width)
On – The vertical sync pulse is narrow.
Off – The vertical sync pulse is wide.

5 – Monitor Follows – Controls input assigned to local monitor output and ID bit termination.
On – Local monitor follows input selection and ID bits 4 & 11 are tied to ground.
Off – Local monitor is tied to input 1 and ID bits 4 & 11 are unterminated.

6 – Mono Audio Left
On – Mono audio is output in the left channel only.
Off – Normal stereo output.

7 – Auto switch
On – Automatically switches to highest numbered input with sync present.
Off – Manual switch mode.

8 – No Backlight
On – The LCD backlight is on for 3 seconds only at power-up.
Off – LCD backlight is on when a signal is present on the selected input.

- Connect power cords and turn on all the devices.

Operation

Level/boost – This alters video output voltage (0.5V–1.45V p-p) to affect brightness. Select a setting in the boost range, indicated by the red line, for use with long cables. Select 100% (maximum level) for cable lengths over 500 feet for computer signals of 15–135 kHz.

Peaking (Peak) – Peaking compensates for detail loss and increases sharpness. Minimum setting (counterclockwise limit) = no peaking. Maximum setting (clockwise limit) = 100% peaking.

Vertical centering ▲▼ and **Horizontal Centering** ◄► – These controls move the image up or down and left and right. The LCD displays V-SHIFT or H-SHIFT when the control is adjusted and MIN or MAX when the centering limit has been reached.

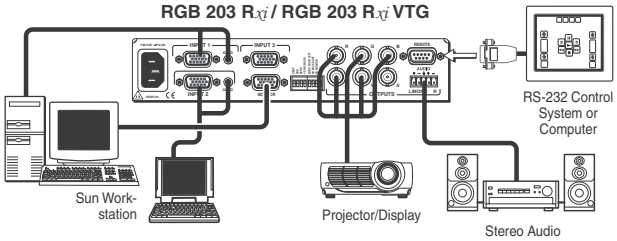
NOTE DDSP disables the vertical and horizontal centering controls. To use the display's centering controls instead of the interface's, set the DDSP DIP switch to On.

NOTE The centering controls have no mechanical limits to rotation.

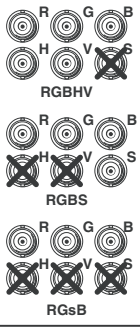
VTG operation (RGB 203xi VTG only) – Set the 203/VTG switch to VTG. Select a combination of display resolution and one of four video test patterns using the 16-position rotary switch.

Connections

RGB 203 Rxi / RGB 203 Rxi VTG



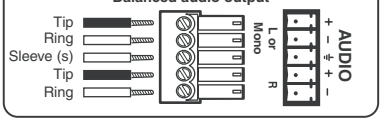
Video output connections



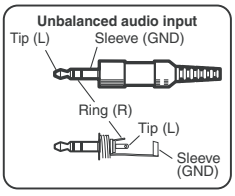
RS-232 pinout table

Pin	RS-232	Contact closure	Description
1	–	Input 1	Select input #1
2	Tx	–	Transmit data
3	Rx	–	Receive data
4	–	Input 2	Select input #2
5	Gnd	Gnd	Signal ground
6	–	Input 3	Select input #3
7, 8, 9	–	–	Not used

Balanced audio output



Unbalanced audio input



Troubleshooting

No response to ▲▼ and ◄► centering controls:

- DDSP is in use. Set DIP switch 1 (DDSP) on the rear panel to Off (down).
- Executive mode disables centering. Turn off executive mode.
- RGB 203 Rxi VTG does not respond to centering controls while in VTG mode. Set the front panel 203/VTG switch to 203.

No response to switching controls:

- Executive mode disables front panel switching. Turn off executive mode.
- RGB 203 Rxi VTG does not respond to switching controls while in VTG mode. Set the front panel 203/VTG switch to 203.

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33-726-01 **A**
01 03
Printed in the USA

Actual label from the RGB 203 Rxi Computer-Video Interface.

by Steve Somers, Vice President of Engineering

VTG 300 Video and Audio Test Signals — As Good As It Gets

There's something about crisp, bright, clean color bars and the wonderment of a flat multi-burst response that just makes the hair stand up on my arms. Yet, a chance encounter with perfect black level and gray scale near extreme white...is as infrequent as a full solar eclipse. And, ultimately, witnessing a perfect, undistorted scope response of a square wave as it passes through an audio system...well, that's about as good as it gets. Test patterns driving systems... scopes tracing waveforms, one after the other...all is as engineers intended it to be...somehow establishing the order of all things electronic.

Don't you agree? If you're a "dyed-in-the-wool" A/V techie, you are now envisioning those rare experiences. If you aren't an A/V techie, you're undoubtedly thinking that this author should "get a life."

It's been some time since we've talked about video test signals and their uses. The exciting launch of the Extron VTG 300 extends the VTG product heritage and brings along with it support for audio testing as well. Today, we're here to talk test signals. For some, my discourse will be review. For others, it will be new. If you will now push the Power On button of your VTG 300, I'll get started.

Test Pattern / Signal Range	Crosshatch 32 x 24	Crosshatch 32 x 18	SMPTE Bars	EBU Bars	Color Bars	H Pattern	16-Level Split Grayscale	Multiburst	Alternating Pixels	White Field
PC	✓				✓	✓	✓		✓	✓
VIDEO	✓		✓ NTSC	✓ PAL		✓	✓	✓ NTSC/PAL		✓
HDTV	✓ 480p and 576p only	✓ Except 480p and 576p			✓	✓	✓		✓	✓
16:9 HR		✓			✓	✓	✓		✓	✓

Table 1: Video/Graphics test pattern groups.

Creating Your Own Video Memories

First, take a look at **Table 1** below to see the application of the 10 unique visual test patterns. Available pattern types are grouped around specific operating formats: computer graphics, NTSC/PAL television, high definition television, or 16:9 widescreen graphics. I'll start discussion on all patterns appropriate for computer graphics, high definition, and 16:9 widescreen graphics. Then we'll look at patterns tailored for NTSC and PAL.

The Graphics Group

White Field

The white field pattern historically demonstrated the uniformity of a white raster generated by a CRT display. Since CRT display uniformity depends on accurate convergence of three electron beams (direct view) or three light beams (projection), the white field pattern will exhibit nonlinear color variations where beam landing is not accurate. It is routinely used to measure light fall-off and efficiency of the optics.

This pattern is still useful for digital projectors since optical performance is still an issue. For projectors using reflective liquid crystal technology, it displays the quality of white uniformity most often called "shading". White uniformity is still a challenging performance characteristic regardless of the display technology.

On the electrical side, this pattern represents full video excursion. On a scope, the video level will be full reference (0.7 volt p-p). This facilitates a quick check of balance between R, G, and B outputs with a scope. Comparing one channel to the other in the invert-and-add mode allows very accurate evaluation of video level and channel balance.

Alternating Pixel Pattern

This pattern is a full-field alternation of 100% white and 0% black levels at the primary operating clock rate (pixel rate) of the selected graphics line rate. This pattern is commonly used to evaluate the speed of a graphics source because the pattern exercises the system at its

maximum rate, which visually demonstrates its high frequency response.

The vertical lines should be crisp and distinct. As system bandwidth declines, the definition of the alternating lines becomes less distinct until the pattern blends to middle gray. At full level, the "modulation depth", or peak transition between black and white, of the image is 100%. Modulation depth decreases (whether display or entire display system) with declining system bandwidth. On a scope, the peaks between white and black begin to descend toward one another until they meet half-way; thus presenting a screen seen as middle gray. In display devices, the pixel rate where the modulation depth reaches only 10% of the full level characterizes its usable resolution.

Split Gray-Scale

Gray-scale patterns tell us about the linearity of the visual presentation. Each intensity step of the 16-level scale is a distinct, equal-size change in luminance value. Dividing a 0.70 volt video signal by 15 (note that one level of the 16 is black) provides 47 millivolts per step (about 7%). Viewing both excursions of the split gray-scale yields a bisected stairstep pattern (see **Figure 1**). This feature enhances evaluation of system linearity performance.

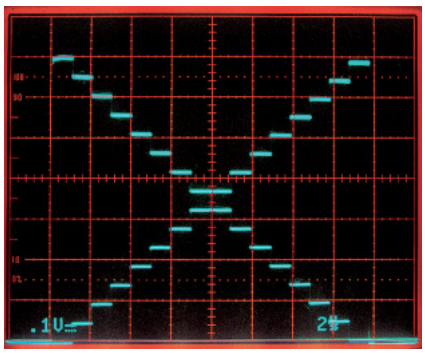


Figure 1: Graphics/PC split gray-scale waveform.

H Pattern

The full field H pattern provides several pieces of useful information about a display system. The letter 'H' is relatively simple to construct electronically and provides a serious test of system high frequency versus low frequency performance. The white character on a black surround requires the display system response to be optimum in order to maintain brightness level between the vertical legs (high frequency content) versus the horizontal connecting bar (low frequency content). As high frequency performance diminishes, the vertical legs become dimmer than the bar. On the scope presentation, the vertical legs represent single pixel events which can be used to measure system rise and fall time effectively. On the display screen, the white 'H' provides an effective means to evaluate image center focus versus corner focus. For digital projectors, the black surround can be used to subjectively evaluate black level performance against the peak level excursions of the text. This also provides more of a real-world perception of usable contrast ratio.

Crosshatch 32x24 and 32x18

One of the oldest and most used test patterns for convergence alignment of CRT displays, the crosshatch, in its many variations, still provides significant support for visual evaluations and testing. Two versions are provided in the VTG 300. The 32x24 version supports tests in the 4:3 aspect ratio (32 divided by 24 = 1.333…) while the 32x18 version (32 divided by 18 = 1.777…) supports the widescreen aspect ratio and, very importantly, sets the absolute outside boundary of the display's active region with a white line border.

Why use a crosshatch for digital projectors? Several reasons. If you are feeding an analog signal to a digital projector, there is still analog video processing which may affect frequency response. Like the 'H' pattern, the vertical lines represent high frequency one pixel events and should be as bright as the horizontal lines. The squares created by the intersecting lines, as well as the overall rectilinear presentation of the pattern, tell us about geometric distortion such as keystone, the most common distortion for digital projectors.

But, here are a couple surprise uses for the old crosshatch pattern. Those technicians working with video over CAT 5 wiring will find it perfect for evaluating and adjusting time delay among the cable pairs. Time delay error created by these UTP cable transmission schemes appears as a misconvergence effect on the screen. But, that's not all. Today, low-cost digital projectors may trade off optical path quality, comprising several components including the projection lens. Though the lens resolving capability may exceed the resolution of the imaging device, what about image distortion? Short focal length (wide angle) lenses, in particular, must have better optical design specs for color correction and other aberrations than its longer focal length counterpart. Use the crosshatch to evaluate corner color separation and elliptical distortion that easily occurs with cheaper lenses. With short throw distance, the peripheral resolution and correction quality of the lens is very important.

Do you have concerns about finding raster edges during setup with some patterns? In the Video Setup Menu, a selection may be made to "turn on" a raster border. This one-pixel border will outline the active image area extremes to ensure proper image positioning.

Split-Field Color Bars

The split-field color bars are enabled when the VTG 300 is in one of the 31 computer graphics scan rates. Color bars support display system testing with the primary colors (red, green, and blue) as well as the secondary colors (cyan, magenta, and yellow) plus a white and black reference. This pattern exercises fully saturated colors which can be measured with appropriate colorimetric equipment to determine color gamut of the display system, among other aspects. The split field arrangement allows viewing of each primary and secondary color against its complement (see **Figure 2**).

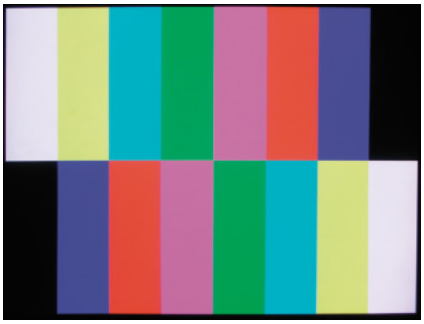
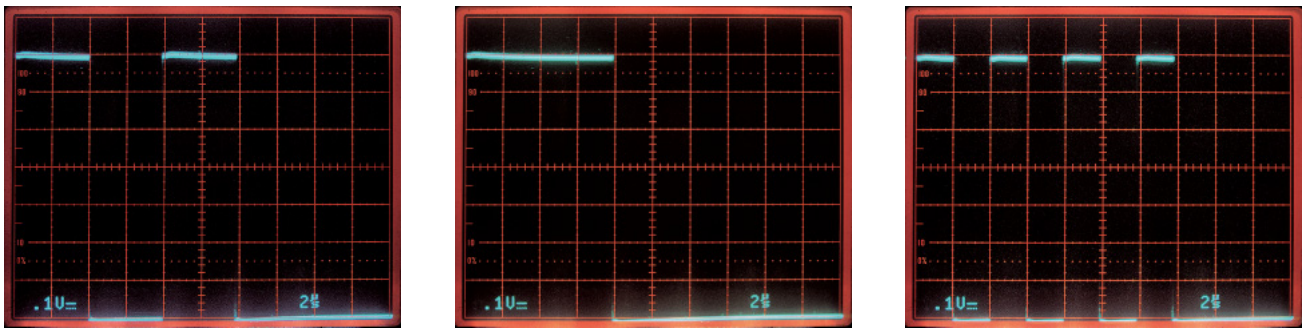


Figure 2: Monitor screen shot of graphics color bars.

continued on page 14



Red Green Blue

Figure 3: Graphics/PC color bar waveform presentation of individual RGB components.

Since, in an RGB output from a graphics system, the white reference bar contains equal amounts of red, green, and blue, full voltage excursion should be seen on each color channel when using a scope (see **Figure 3**). In addition, any primary color should be 100% level where it contributes to any color recreation.

NTSC/PAL Television Group

The following patterns are designed for television performance testing and are enabled only when "video" is selected.

SMPTE Color Bars

With full conformance to SMPTE 170M and when generated using a fully digital encoder, the 75% SMPTE color bars standardize adjustment of color gain, phase, and display black level controls (ref: SMPTE EG 1-1990). SMPTE 170M specifically defines the composite analog video color signal for professional studio applications. The light gray reference bar is followed by the primary and secondary colors in order of decreasing luminosity. The SMPTE version modified previous EIA bars in two ways. The small color boxes were added in between the color patches to provide easier, more accurate adjustment of color level and color phase. The "PLUGE" stripes were added in the black region on the lower right to facilitate black level setup.

With only the blue bars viewable (either by turning OFF the red and green outputs or viewing through a blue filter), the color level control is adjusted until the two outside blue bars match the intensity of the outside small blue patches. There should be minimal difference in intensity between them at the proper setting. Next, the color phase (tint) control is adjusted until the two inside bars closely match the intensity of the patch below each. Some alternating adjustment between color level and phase is normal since the effect is interactive.

For correct black levels, adjust the brightness (black level) control so that the black area of the pattern just matches the "blacker-than-black" stripe in the PLUGE area. The brighter-than-black stripe should just be visible.

Viewing the color bar pattern on a waveform monitor or oscilloscope yields the waveform seen in **Figure 4. Figure 5** shows the correct decoding on a vectorscope of the color bar signal in the display system. Note, in the vectorscope photo, that the phase is very stable and the peak excursions each fall within the +/-2% box, an indication of a broadcast-quality generated signal.

EBU Color Bars

EBU color bars are designed for setup and testing of PAL television signals and displays. The test pattern lacks the patches for color level setup; however, due to the construction of the PAL system, the tint control is not required. Refer to **Figure 6** for a scope or waveform monitor presentation and **Figure 7** to see the vectorscope presentation. The alternating sets of vector signals are decoded by the display to mostly cancel variations in color phase errors. This is why PAL displays do not have a phase, or tint, control.

Multiburst Pattern

The multiburst pattern may be used for NTSC and PAL systems. It provides a quick, visual test of the television display, or system, frequency bandwidth. Looking at the waveform monitor presentation of **Figure 8**, we can see that a series of equal-amplitude sine wave bursts of 0.5, 1.5, 2.0, 3.0, 3.58, and 4.2 MHz respectively (for NTSC) are imposed on a 40 IRE level. Note that the signal extends to only 70 IRE. This is designed to avoid intermodulation effects in NTSC transmitters; although for laboratory use, 100 IRE signal amplitude may be used. When system bandwidth is such that any one or more of the frequency bursts is attenuated significantly, the brightness of the burst's transitions tend to dim toward middle gray. This attribute makes visual assessment of the system's performance quite easy. For PAL, the frequency components around the subcarrier frequency and band limit are changed to match the required values of that standard.

Television decoders notoriously attenuate the upper frequencies around, and including, the 3.58 subcarrier. Color burst is included with this pattern so as to ensure the chroma processing system is on and operating. The decoder's ability to separate the luminance information (which utilizes the entire system bandwidth) from the chrominance information (which is centered about the 3.58 subcarrier frequency) is of paramount importance for quality imaging of television signals. The visual integrity of this pattern on a display provides direct insight into the quality of that process.

Putting the 'A' in A/V

A/V techs will find that the VTG 300 provides a suite of audio test signals capable of satisfying

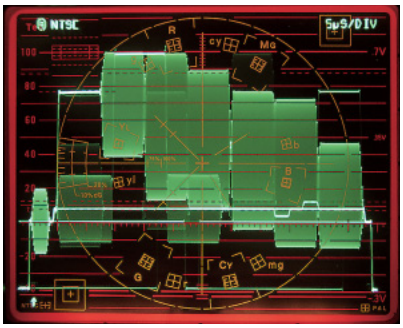


Figure 4: Waveform monitor presentation of 75% SMPTE color bars.

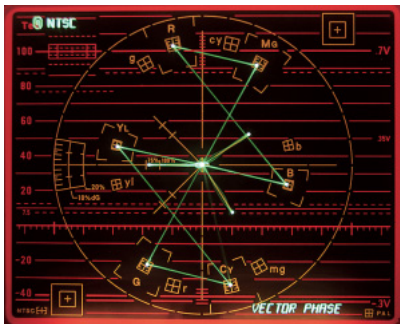


Figure 5: Vectorscope presentation of NTSC 75% color bars.

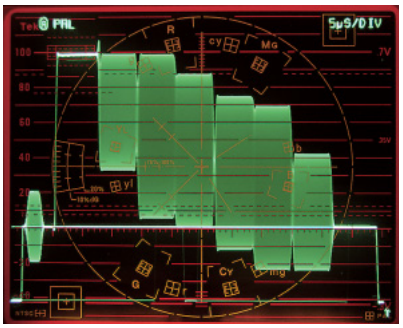


Figure 6: Waveform monitor presentation of PAL-EBU color bars.

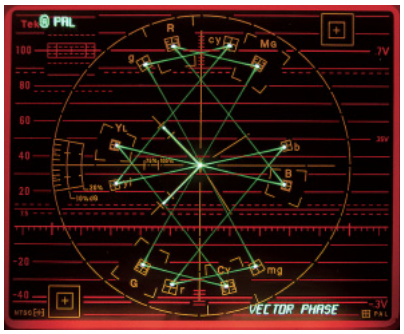


Figure 7: Vectorscope presentation of PAL-EBU color bars.

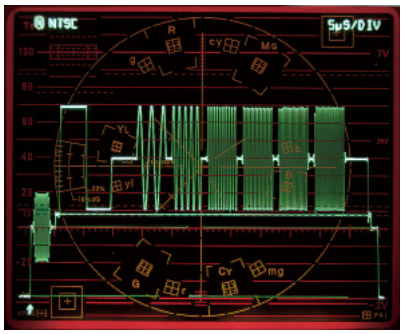


Figure 8: Waveform monitor presentation of the multiburst pattern.

most of their needs. The complement includes white noise, pink noise, sine wave, square wave, swept sine wave, and a unique polarity test.

Why have "noise" as a test source? White noise is known as a broadband noise, which means it is composed of all frequency components at equal energy level in random order. This characteristic of wideband noise makes it invaluable when evaluating the frequency bandpass characteristics of audio systems. White noise gets its name from the connotation with white light wherein white light is said to be composed of an infinite number of wavelengths of visible energy.

The pink noise source in the VTG is intended as the standard signal source when evaluating the acoustic performance of a sound system with a real-time analyzer. Humans perceive twice the power level for each octave increase in audible frequency, so white noise "sounds" as though the power is rising at 3dB per octave. Pink noise is lowpass-filtered white noise (at -3dB per octave) such that, on a real-time analyzer, it appears to be flat over the entire audible frequency band.

Using Waves

The more common tests in audio systems evaluate linearity, distortion, gain, etc. The VTG 300 sine wave source is adjustable in one-third octave steps from 20 Hz to 20 kHz with specific stops at the most commonly used values, such as 400 Hz and 1000 Hz. A swept sine wave function may be invoked which covers the same range, but continuously. A swept sine wave is useful for evaluating systems for resonances such as rattles and other unwanted vibrations. The sweep-time interval is selectable from 1.5 seconds in seven increments to 150 seconds.

The square wave is used in amplitude and phase versus frequency measurements. The frequency may be set among 25 steps from 20 Hz to 5 kHz. This time-domain test, when viewed on an oscilloscope, tells the technician about the quality of rise time, overshoot, ringing, tilt, and slew rate of the system under test. The first four of these attributes are indicative of the system's response in the frequency domain (i.e. low frequency and high frequency characteristics).

What's Your Sign?

Sometimes, newly installed audio wiring is passed over during the labeling routine and the polarity from/to the amplifier is unknown. At any rate, phasing speakers or testing amplifier output polarity is a common occurrence. The Polarity Test in the VTG 300 is a unique test signal comprised of a 1 Hz pulse having a duty cycle of 0.1% (about 1 millisecond). When connected to the audio system input, it may be used along with polarity receivers such as the Galaxy Audio Cricket or the Rolls PT102 for a rapid verification of cabling connectivity.

Shouldn't every A/V techie be using video and audio test signals? Having them in the palm of your hand certainly enhances the convenience. With each passing year, the benefit-to-dollar ratio in electronic systems rises. The trend includes most measurement tools, like the venerable oscilloscope. Take it from me: Learning to use basic, but necessary, audio/video test signals in an A/V system installation is the only way you're going to create those rare electronic memories for yourself.

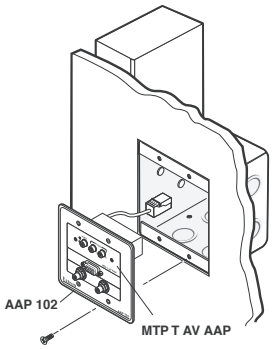
NEW

MTP T AV AAP and MTP T SVA AAP

Mini Twisted Pair Transmitters

MTP T AV AAP

MTP T SVA AAP



The Extron **MTP T AV AAP** and **MTP T SVA AAP** Mini Twisted Pair Transmitters are economical, compact products designed for easy integration into any Extron product that has openings for double space Architectural Adapter Plates (AAPs).

The MTP T AV AAP is a double space AAP for composite video and unbalanced stereo audio; video input is on a female BNC connector. The MTP T SVA AAP is a double space AAP with S-video and unbalanced stereo audio; video input is on a 4-pin mini DIN connector. Audio for both models is on female RCA connectors, while the analog twisted pair output utilizes a female RJ-45 connector.

MTPs can be used with Extron Skew-Free™ A/V UTP cable or any CAT 5, 5e, or 6 twisted pair cable for point-to-point cable runs of up to 1,000 feet. All MTP transmitters are powered products and provide active balanced transmissions for both video and audio.

MTP T AV AAP

Part Numbers	List Price
70-361-01 (gray)	$185.00
70-361-02 (black)	
70-361-03 (white)	

URL
www.extron.com/mtptcv

MTP T SVA AAP

Part Numbers	List Price
70-362-01 (gray)	$230.00
70-362-02 (black)	
70-362-03 (white)	

URL
www.extron.com/mtptsv

*Prices listed in US Dollars, valid for US sales only.

NEW

MPS 112CS

Media Presentation Switcher

MPS 112CS

The Extron **MPS 112CS** is a media presentation switcher that merges three independent switchers in a single enclosure: a four input, one output VGA with stereo audio switcher, a four input, one output S-video with stereo audio switcher; and a four input, one output composite video with stereo audio switcher. The easy-to-integrate MPS 112 switcher is a cost-effective solution to signal routing applications that usually require three separate switchers, such as small conference rooms, boardrooms, classrooms, and rental and staging environments. Recently introduced, the MPS 112CS differs from the MPS 112 in that it includes a balanced/unbalanced microphone input on captive screw connectors, 48V microphone phantom power for condenser microphones, and a balanced/unbalanced program audio output on captive screw connectors.

MPS 112cs

Part Number	List Price*
60-532-02	$825.00

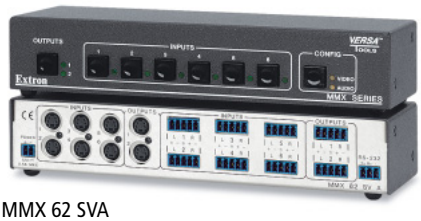
URL
www.extron.com/mvc112cs

*Prices listed in US Dollars, valid for US sales only.

NEW

MMX Series

Video with Audio and VGA with Audio Mini Matrix Switchers



MMX 62 SVA

The Extron **MMX Series** of VGA and video mini matrix switchers combine full-size matrix capabilities with a compact, 1U, half rack width VersaTools™ enclosure, providing economical, simple to use routing and switching solutions for composite video, S-video, or VGA with stereo audio (balanced/unbalanced).

MMX Series

	Part Number	List Price*
MMX 32 VGA A	60-565-01	$895.00
MMX 42 SVA	60-556-22	$1,095.00
MMX 42 SVA RCA	60-556-32	$995.00
MMX 42 AV	60-556-21	$950.00
MMX 42 AV RCA	60-556-31	$895.00
MMX 62 SVA	60-557-22	$1,295.00
MMX 62 SVA RCA	60-557-32	$1,195.00
MMX 62 AV	60-557-21	$1,195.00
MMX 62 AV RCA	60-557-31	$1,095.00

URL
www.extron.com

*Prices listed in US Dollars, valid for US sales only.

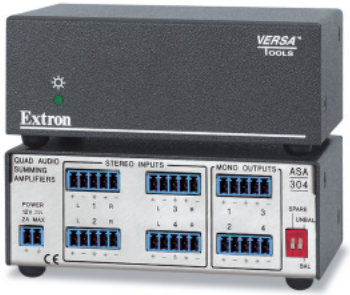
NEW

ASA 101, ASA 204, and ASA 304

Audio Summing Amplifiers

ASA 101
Single passive version

ASA 204
Quad active unbalanced audio version



ASA 304
Quad active balanced audio version

The Extron **ASA 101**, **ASA 204**, and **ASA 304** high performance audio summing amplifiers convert two-channel stereo audio signals to balanced/unbalanced one-channel mono audio signals. Designed to be inserted between a stereo audio source output and a mixer or pre-amplifier input, the ASA Series models are ideal for use with source point and distributed audio systems in churches, halls, arenas, stadiums, and other environments that have a mono system.

The Extron ASA models of high performance audio summing amplifiers convert two-channel stereo audio signals to balanced or unbalanced one-channel mono audio. The ASA 101 Audio Summing Amplifier includes two two-foot long pigtails with male RCA connectors for stereo input signals and captive screw connectors for balanced/unbalanced mono audio output.

The ASA 204 and ASA 304 can convert the stereo audio signals from four different sources to mono audio signals. The ASA 204 accepts unbalanced stereo input signals on RCA connectors, while the ASA 304 accepts balanced/unbalanced stereo input signals on captive screw connectors.

ASA 101

Part Number	List Price*
60-551-01	$60.00

ASA 204

Part Number	List Price*
60-552-30	$265.00

ASA 304

Part Number	List Price*
60-552-20	$295.00

URL
www.extron.com/asa101
www.extron.com/asa204
www.extron.com/asa304

*Prices listed in US Dollars, valid for US sales only.

by Ian Foresman, Applications Technology Manager

Optimizing Your Image with Auto-Image™

Setting up a scaler for optimum size, position, clock, and phase adjustments

The art or science of calibrating and adjusting video equipment has changed over the years. The number of items to calibrate has grown from settings such as brightness and tint to adjustments including aspect ratio, sizing, and pixel phase as sources, displays, and signal processing equipment have increased in variety and complexity. Scalers, or devices that take in a video image at one resolution and output the same image at another resolution, add to the settings that a video professional must adjust when calibrating a video system for optimum image quality.

Unless, perhaps, you have a scaler that can "Auto-Image." The Auto-Image feature available on Extron's newest scalers and scan converters was designed to minimize the work in calibrating many scaler adjustments. After all, why adjust something manually that can be set automatically? But new features always bring new questions. What is Auto-Image? How much can it do? Where and when should it be used?

This article will answer those questions and more by discussing the four settings affected by Auto-Image: size, position, clock, and phase. It will define them and how they should be set to achieve maximum image quality. Then, we'll cover the "Auto-Image" feature, how it works, and its advantages and limitations.

If you're experienced in calibrating digital displays, you'll find many of the concepts familiar. See the sidebar on projector setup (page 22) to clarify the similarities.

Size and Position

Left-right, up-down, bigger-smaller. The idea is to fill the whole screen with the image in the right place. The adjustments seem simple enough, they are intuitively obvious, and anyone can see and understand their effects. But does everyone comprehend what must happen to a video signal to change where, and how large, an image is?

To demonstrate how a scaler adjusts an image's size or position, let us consider an example of how a scaler works. **Figure 1** shows a typical scaler application with a DVD player, an Extron ISS 408, and an LCD projector. The scaler's job is to take the NTSC signal in and deliver the signal that the projector works best with, in this case 1024 x 768, RGBHV. **Figure 2** demonstrates what happens at the signal level, line by line.

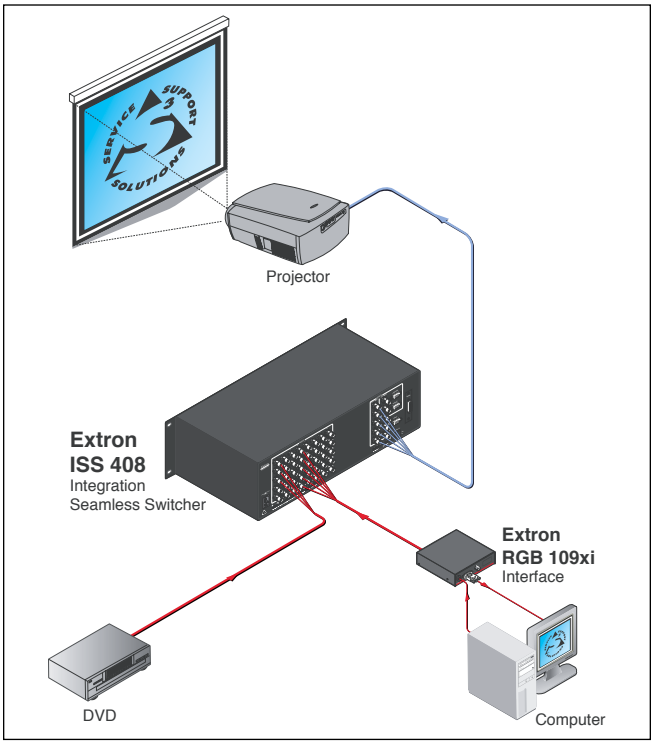


Figure 1: A typical scaler application.

A standard NTSC signal in the Y, Pr, Pb format is input to the scaler. To capture the incoming information, the scaler samples active video and stores the active video information digitally.

Next, the scaler must scale the line of digital video information captured into a line of digital video information consistent with the output format. The line of digitized information must be reclocked with the correct number of pixels, in this case 1024. Those pixels must be clocked evenly throughout the active horizontal time envelope of the output resolution.

Once lines of active video are horizontally reclocked to their new format, they are mathematically processed to create new frames of video with the correct number of lines, 768 in this example, for the output format. This number of lines will be clocked out evenly

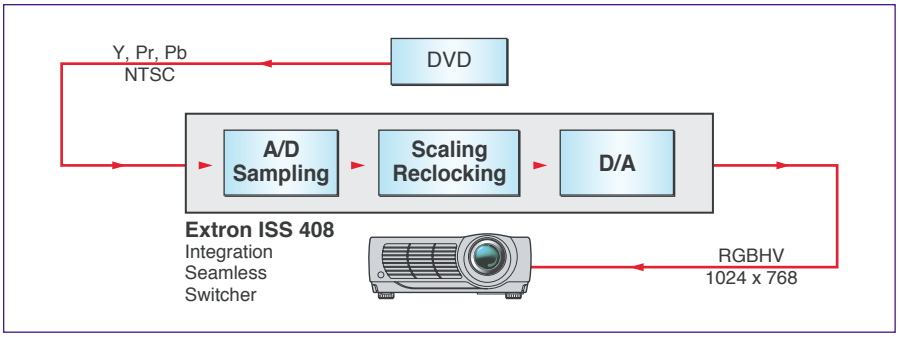


Figure 2: Transmission of an NTSC signal.

throughout the active vertical time frame for the new output rate. The digital video information is then converted back to analog and output as RGB to the display.

The sync signals are sampled and reclocked as well, but it is the analog portion of the video that will be used when resizing and positioning the signal within the scaler.

Now the video has been scaled to what should be the correct format for the projector, and what should be the correct size and position. However, a 1024 x 768 image that is perfectly sized on one display may appear too large or too small on another, or in the wrong place.

If an image appears too wide (**Figure 3-1**), the lines of video can be altered to clock the pixels into a shorter line of active video, to correct the image size (**Figure 3-2**). If the image is too narrow, the active video time can be increased. If the image is shifted too far to the left or right, the start of the active video timing can be delayed or started earlier relative to the H sync, to shift the image to the right or left, respectively.

A similar process takes place when making adjustments in vertical size or position. Size is determined by the number of active lines output by the scaler, and position by when those lines start relative to the vertical sync pulse. Increasing or decreasing the number of lines that hold the active video information that was originally sampled changes the size of the image (**Figure 4**). Increasing or decreasing the time between the start of those lines and the vertical sync pulse moves the image up or down.

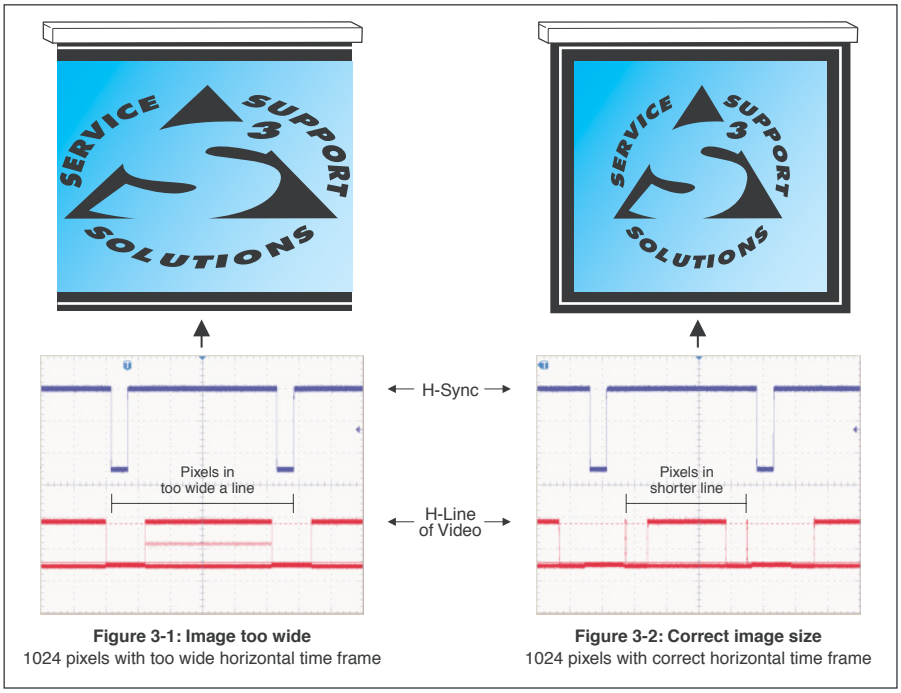


Figure 3-1: Image too wide
1024 pixels with too wide horizontal time frame

Figure 3-2: Correct image size
1024 pixels with correct horizontal time frame

Figure 3: How a scaler corrects horizontal image size.

It is important to note that features have limitations. At some point when increasing the size of an image, the active video time frame will reach its maximum, and increasing the size further will result in cropping the edges of the image. Similarly, if an image is shifted too far left or right, up or down, the edges of the image will fall out of the active portion of the video and vanish from the screen, one line or pixel at a time.

A good scaler will allow the image to be adjusted so the image fills the raster of the display, thus getting the full potential out of the display device. However, the size adjustment may not be finished; the clock adjustment must be considered.

Clock

Adjusting the clock of a scaler is often done without much consideration for, well, adjusting the clock. This is not necessarily bad, and it occurs for a number of reasons. The most pertinent is that in many scalers the clock adjustment is made by adjusting the horizontal size of an image.

The clock adjustment of a scaler adjusts the number of samples taken across a line of active video input to the scaler. Sampling is an important concept in analog to digital conversion and is the subject of many theorems, rules, and principals which serve to demonstrate, amongst other things, that when sampling a video signal, it is best to sample at a rate of, at least, one sample per incoming pixel.

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Optimizing Your Image with Auto-Image (continued)

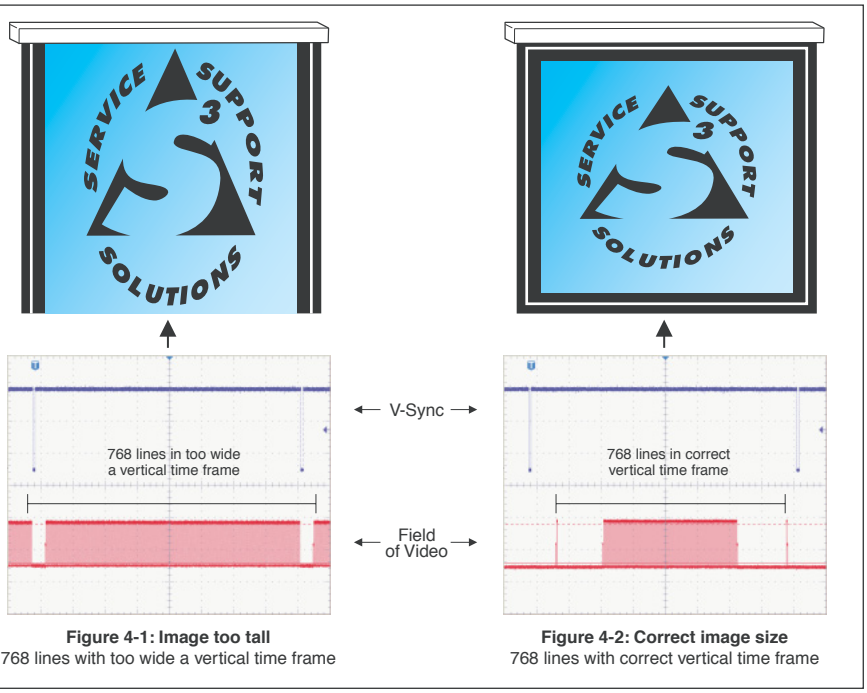

Figure 4-1: Image too tall
768 lines with too wide a vertical time frame

Figure 4-2: Correct image size
768 lines with correct vertical time frame

Figure 4: How a scaler corrects vertical image size.

Consider **Figure 5**, which shows the second source from **Figure 1** being scaled. In this example the signal of a PC is delivered at 1024 x 768 to an Extron ISS 408, then to a projector at 1024 x 768. This example represents one of the greatest challenges that a scaler can meet head on, delivering one pixel out for one pixel in, or as many pixels out as in. It is accomplished by the scaler in this example by sampling one pixel on the input for each pixel output.

Clock, or pixel clock as it is sometimes called, can be adjusted in a number of different ways. In the ISS 408, adjusting the horizontal size is done by changing the number of samples taken across a given time of active video, as shown in **Figure 5**. If the number is increased the image gets smaller, and vice-versa. By adjusting the size in this way, the scaler is also adjusting the clock, or the number of samples per pixel.

Figure 5 also demonstrates an additional impact of adjusting the size in this way. The lower image in each section of **Figure 5** shows an oscilloscope readout of the number of pixels sampled on the input versus the number generated on the output. The top image in each section shows the resulting image, and in some cases the artifacts that occur as a result of the clock speed. The test pattern is a pixel on, pixel off pattern, where every other pixel is turned on, and then off, and can be generated in many ways with computers or test generators.

Current technology allows for clock speeds that sample at a rate of one sample per pixel. Over sampling, or taking many more samples than there are pixels, would be preferred, however IC performance and cost currently limit most scaler technology to 1:1 sampling

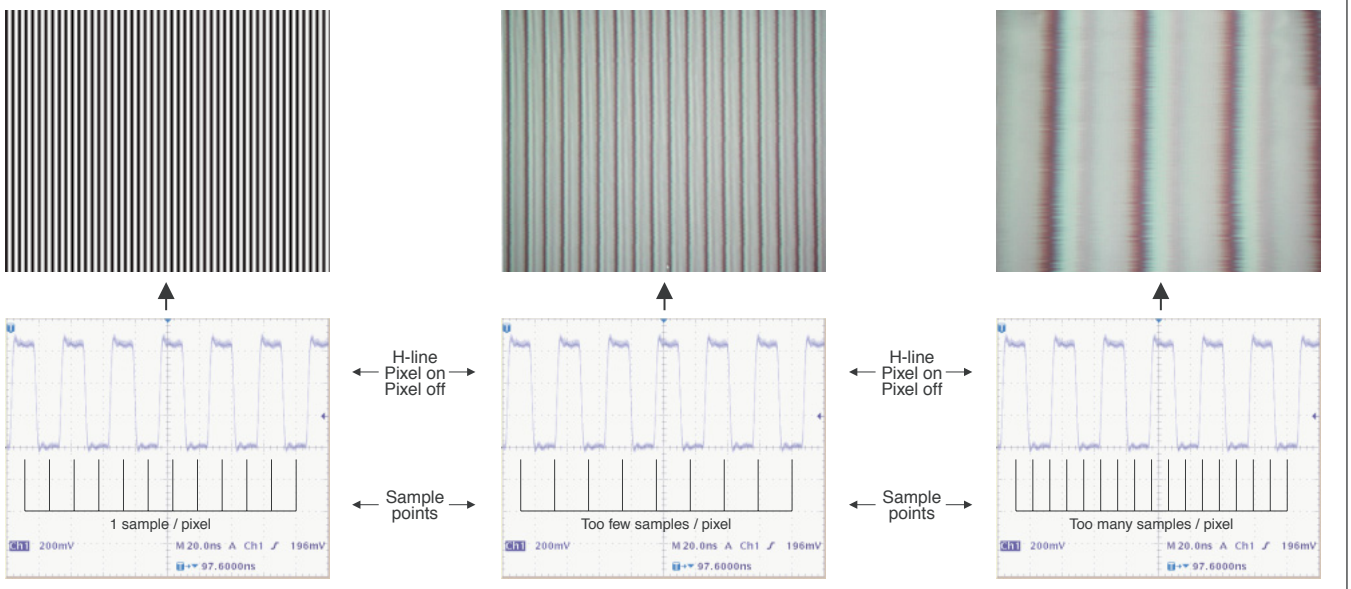

Figure 5-1: Sampling

Figure 5-2: Under sampling

Figure 5-3: Over sampling

Figure 5: Examples of correctly clocked, under clocked, and over clocked signals.

Optimizing Your Image with Auto-Image (continued)

at best. Setting a scaler's clock to sample pixels 1:1 in challenging applications is crucial to generating good image quality. **Figure 5-2** shows the artifacts that will occur with under sampling an image. Over sampling [**Figure 5-3**], can cause artifacts as well, especially when sampling at a rate close to 1:1. Sampling at a rate of 1:1 [see **Figure 5-1**] will generate the best image.

It is important to note that adjusting the vertical size also adjusts whether or not certain artifacts will be present. Since a vertical size adjustment manipulates the number of lines of active video present on the output, artifacts such as horizontal line loss, or lack of consistent horizontal line brightness, can be present if the vertical size setting is not set to scan one line out for every line sampled in.

Phase

The phase adjustment of a scaler is used to manipulate where on a pixel a scaler takes a sample. Where the clock setting adjusts how many pixels will be sampled, the phase adjusts what part of the pixel the sample will be taken from. Consider **Figure 6**. By changing the phase adjustment of the ISS 408, adjusting the point at which pixels are sampled, the image can be sampled at the perfect place upon the pixel, which gives the clearest, sharpest image [see **Figure 6-1**]. Sampling at the wrong point on the pixel will result in an image that "shimmers" with noise. Sampling on the leading or falling edges of the pixels, [**Figure 6-2**], results in an image gray with noise.

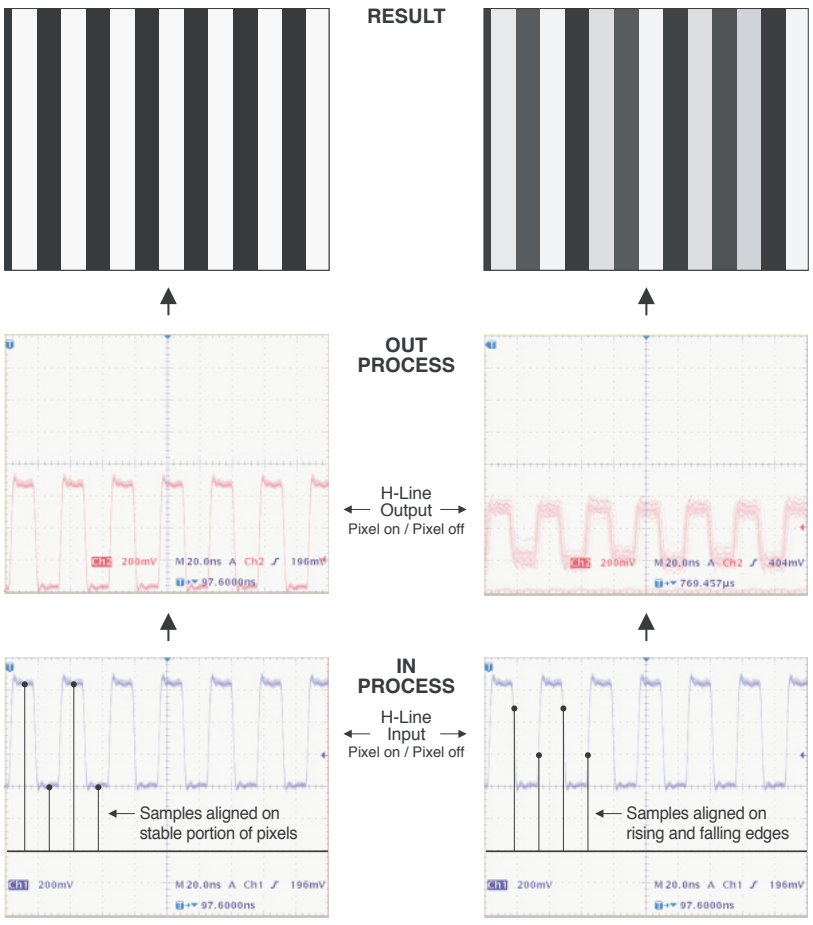

Figure 6-1: Sample phase set correctly

Figure 6-2: Sample phase set incorrectly

Figure 6: Examples of correctly and incorrectly phased signals.

Auto-Image™

So now to the Auto-Image feature, where again one might ask, "Why would I adjust manually what the scaler can do automatically?" The answer to that question would be that you wouldn't, or you would just check to see if the scaler did it right. But that leads to another question: will the scaler do it right?

Most of the time it will, though sometimes minor adjustments may be necessary to perfect an image. To clarify, let's discuss how Auto-Image works.

When a scaler such as the ISS 408 "sees" an image, it must identify the signal to decide what to do with it. This can be done after the scaler has digitized the video and sync information by measuring parameters of the signal. Then, the scaler can:

- Pull up a memory saved for that incoming signal's parameters to dictate size, position, clock, and phase.
- Load default settings for signals not previously saved.
- Auto-Image, or generate a new set of parameters, to dictate the size, position, clock, and phase.

When the scaler performs the Auto-Image function, it looks at video parameters mathematically, such as active video timing, sync timing, and blanking interval, and uses these parameters in an algorithm that calculates the settings. But when is it appropriate to use the Auto-Image feature, as apposed to recalling settings or applying factory defaults?

To answer this question, let's look at why Auto-Image is a useful feature:

- Auto-Image dials in 90% of all images close to perfect the first time.
- Auto-Image works with video signals new to the scaler and with signals that have been encountered by the scaler before.

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Optimizing Your Image with Auto-Image (continued)

- Auto-Image uses parameters calculated from the actual video information present, not arbitrary values set for signals that are new to the scaler.
- Auto-Image is fast, easy, and requires almost no training to use.

These facts make Auto-Image a useful feature in a number of different scenarios. During initial setup, Auto-Image can be used to set up a scaler or scan converter. The settings can then be tweaked if necessary and saved to memory. During live events, Auto-Image can be used to configure a scaler for a new source on the fly. And, it can be used any time a scaler or scan converter is used with sources that are new to the device, and where no trained personnel is available to calibrate, such as in a classroom environment where different laptops are used every day.

To use Auto-Image to its best advantage, it is important to know when other features, such as recalling auto presets, will produce better results. To understand why, let's consider some of the limitations of Auto-Image:

- When Auto-Image gets different information, it delivers different results for size, position, clock, and phase. This happens because video information changes with the image on the screen.
- Auto-Image is a feature limited by the programming and processing power of the machine that drives it. Despite advances in processor speed and memory storage, a scaler or scan converter is still a machine.
- It can be thorough but not creative, and it lacks the power to deal with the unexpected, or to improvise. The human eye and brain are unlikely to be matched in this regard, and a trained A/V technician will probably be able to improve on most settings.

Because of these limitations, it is best in most permanent installations to turn the Auto-Image off after initial setup. Once an image has been set, Auto Presets can be used to recall those same settings. This will ensure the right settings are called up every time the device sees that signal. Auto Presets will typically pull up an image faster, too.

The Auto-Image feature can still be used in products such as the ISS 408 even after the Auto-Image feature has been turned off by forcing Auto-Image on a particular input. This allows users to Auto-Image new sources even when using saved auto presets.

The Bottom Line

Auto-Image is a useful calibration feature. It delivers calibration of size, position, clock, and phase adjustments at the touch of a button. While Auto-Image doesn't deliver a perfectly calibrated image every time, it always gets pretty close. This can save a technician a little time and effort. It can also save an executive from uncomfortable moments in front of a live audience.

That's because Auto-Image does its job well and fast, and it's as easy as pressing a button. So the next time you need to set up your scaler or scan converter, try Auto-Image.

ExtroNews Survey Winner

Congratulations to Jim Murphy of Sound Concepts, LLC in Mason, OH. He's won a free VTG 300 Handheld Battery Powered Video and Audio Test Generator. Jim entered the drawing by filling out and returning his ExtroNews survey card, and was chosen randomly from an overwhelming number of submissions.

Thanks to all of you who provided feedback. Your comments help us continually refine ExtroNews to bring you more useful information. Look for the next survey (and your chance to win free product!) in the next issue of ExtroNews in early 2004.

The Next Step: Projector Setup

After reading "Optimizing Your Image with Auto-Image", you have probably noticed a startling similarity between projector and scaler setup. The two processes are closely related, because digital displays such as LCDs, DLPs, and plasmas work in much the same way as a scaler.

At the front end of a digital display, analog video is sampled and stored digitally. The digital display also reclocks the incoming signal to the native resolution of its internal raster. These two steps are the same for a scaler and a display device. Then, the process differs as the scaler prepares to deliver a video signal and the display prepares to convert its data to projected light. Until that point, the two devices perform many of the same functions.

As such, setting up size, position, clock, and phase on a digital display is much the same process as setting these parameters on a scaler. There will be differences, however.

Some differences will come in the form of nomenclature. What Extron calls "clock" another manufacturer might call "tracking." What Extron describes as "adjusting vertical sizing" might be designated by another manufacturer as "setting the number of vertical lines." Many manufacturers have different names for the same thing.

One goal of "Optimizing Your Image with Auto-Image" is to teach the concept of the feature being adjusted. Once you understand the concept, the different nomenclature should fall into place by playing with the settings, seeing the effects on the image, and thereby viewing what you are adjusting, whatever you want to call it.

Other differences will be apparent in the way a device makes adjustments. Take, for instance, the fact that the Extron ISS 408 adjusts the horizontal size and the clock using the horizontal size adjustment. Some display manufacturers will adjust these parameters with a single setting, others will have separate adjustments: one for clock, another for horizontal size. Again, understanding the concept will help you make sense of how to configure the parameter.

Finally, it is important to note that setting up one device does not eliminate the need to set up the other. In the case of the ISS 408, set up the display device first using the internal test patterns of the ISS 408. Once that is completed, you can set up the ISS 408, typically without having to set up the display again.

ExtroNews publishes information about new products that are relative to the Extron product line in the New News section. If you would like a new product to be reviewed for New News, please send a press release, literature, contact name, and a color slide or photo to: **New News c/o Lee Dodson, Extron Electronics, 1230 South Lewis Street, Anaheim, CA 92805, phone: (714) 491-1500, ext. 6394, or send e-mail to extronews@extron.com.**

WT600

NEC
www.nec.com

NEC has introduced the **WT600**, which uses NEC's patented lensless mirror design to attain the shortest throw distance of any available front projector. The new projector can project a 40 inch image from only 2.5 inches (6.4cm) from the screen and a 100 inch image from only 26 inches (65.9cm). The DLP-based, 1,500 ANSI lumen WT600 features a 3000:1 contrast ratio and XGA resolution with NEC's Advanced Accublend technology for display of non-native sources up to UXGA. Additional features include a lamp life of up to 3,000 hours, wired and wireless (Wi-Fi) networking capabilities, and an extended suite of anti-theft security measures. It has a suggested USD list price of $6,995.

XV-Z10000U

SHARP
www.sharpusa.com

Sharp recently announced the **XV-Z10000U** high definition DLP front projector for the home theater market. Utilizing the New Mustang/HD2 DLP chip set from Texas Instruments and Sharp's second-generation video scaler circuitry, the XV-Z10000U has a native resolution of 1280 x 720 pixels. Features include a switchable contrast/brightness function that allows a contrast ratio of 2600:1. The DVI input is also Home Theater PC (HTPC) compatible and is capable of High Definition Content Protection (HDCP) protocol. Additional features include a six-segment, 5x-speed color wheel, 1:1.35 manual zoom and a lens shift function. It has a suggested USD list price of $11,995.

Reflection CL-510

RUNCO
www.runco.com/products

Runco's **Reflection CL-510** and **CL-510LT** are new high-definition DLP projectors featuring integrated video processing that incorporates 3:2 pulldown compensation. The CL-510 offers a variable throw distance of 1.75:1 to 2.0:1 while the CL-510LT provides a longer variable throw distance of 2.3:1 to 3.0:1. Both models include electronic keystone correction, discrete IR and RS-232 control, a 1700:1 contrast ratio, 900 ANSI lumens, and five input channels. Suggested USD list prices are $5,995 for the CL-510 and $6,995 for the CL-510LT.

Notevision XG-C55X

SHARP
www.sharpusa.com

The Sharp **Notevision XG-C55X Multimedia LCD Projector** weighs 11.3 lbs and includes two separate RGB inputs, including loop out as well as separate S-video and composite video inputs. It features a native XGA (1024 x 768) resolution with a maximum resolution of up to UXGA with ImageACE resizing. Control options include RS-232 and an IR remote. Along with a low power mode for extended lamp life, the XG-C55X offers variable audio output, 3,000 ANSI lumens, picture-in-picture, color management, and a slate of theft deterrent features. It has a suggested USD list price of $5,695.

ScreenPlay 5700

INFOCUS
www.infocus.com

The new InFocus **ScreenPlay 5700** is a home theater projector that includes the Matterhorn DLP technology from Texas Instruments. The projector has 1,000 ANSI lumens, a 1400:1 contrast ratio, and native 16:9 resolution (1024 x 576). There are eight selectable video sources and three control and communication options, including RS-232, USB, and infrared. The ScreenPlay 5700 includes the Emmy® award winning DCDi technology from Faroudja, which provides additional color and sharpness, noise reducers, and a videophile-grade scaler. It has a suggested USD list price of $4,999.

LC-X5 Powerhouse

EIKI
www.eiki.com

The new **EIKI LC-X5 Powerhouse** projector lives up to its name with 6,500 ANSI lumens at 90% uniformity. The LC-X5 uses a 1.8" PolySilicon active matrix TFT LCD panel and has a native resolution of 1024 x 768 (XGA). It projects images up to 40 feet wide (600" diagonal) and offers a wide choice of lenses with EIKI's new Quick Change Lens Installation System. Additional features include power zoom, power focus, three input channels, and multiple control options including RS-232, USB, and mouse control. Optional input and control modules allow for extensive reconfiguration. The LC-X5 has a suggested USD list price of $19,995.

Trickle Tester

Tweeker Use #68

Gil Gauthier, an A/V specialist at Advance Professional Division in Winnipeg, Manitoba, Canada, uses his Extron Tweeker to perform preflight fuel tests on his Cessna 156 airplane. "Under each wing, there is a drain valve that I use to test the fuel for contaminants prior to each flight," Gil says. "The cold weather here in Canada often causes the plastic of my testers to become brittle and break. One day I put my Extron Tweeker in the tester's beaker and pressed the free end into the valve to get the fuel going. I've modified my 'Tweeker tester' with a piece of wire to keep the Tweeker centered in the beaker, but it's essentially the same."

If it does all that for Gil, who knows what the Wright brothers could have done with an Extron Tweeker?

In the cold harsh environment of Canada, most fuel drain testers would break because they were made of plastic.
Ever since I switched to the Extron Tweeker Tank Trickle Tester I've been flying high ever since....
Extron

Send us a photograph and brief explanation of how you use the Tweeker.
If we publish it in a future issue of ExtroNews, we'll send you a free **VTG 300**.

Please send entries with contact information to:
Extron Tweeker Contest, 1230 South Lewis St., Anaheim, CA 92805.
Or e-mail a high resolution photo and explanation to tweeker@extron.com

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